

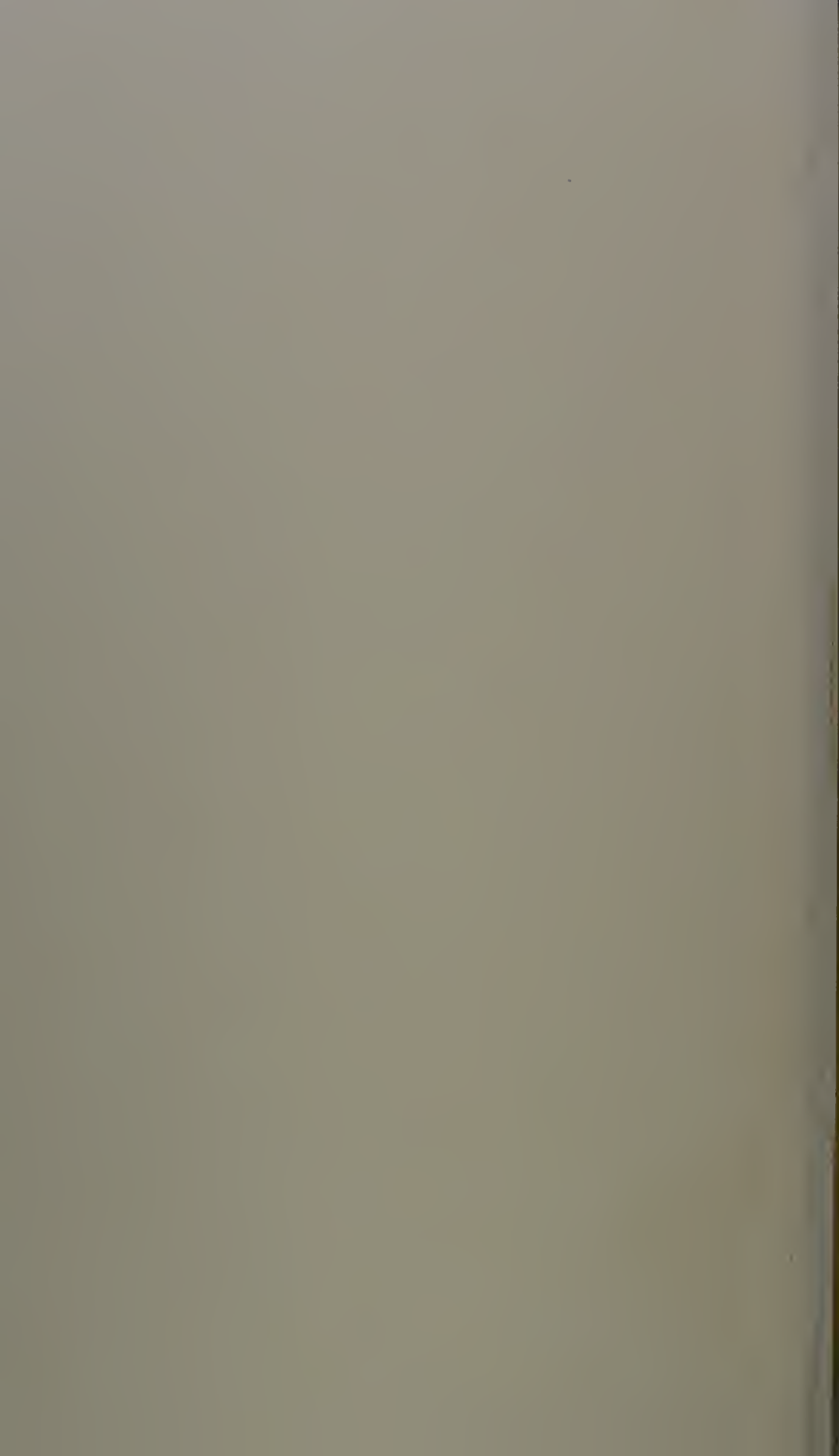




PLATE I.

Sternoptix Celebes.

Br (tr. . . . 1,
 Br. R. . . . 5
 D. 1/10
 A. 2/13
 C. 18+18
 P. 10
 V. 1/7

Fig. 1.
 (Nat. Size)

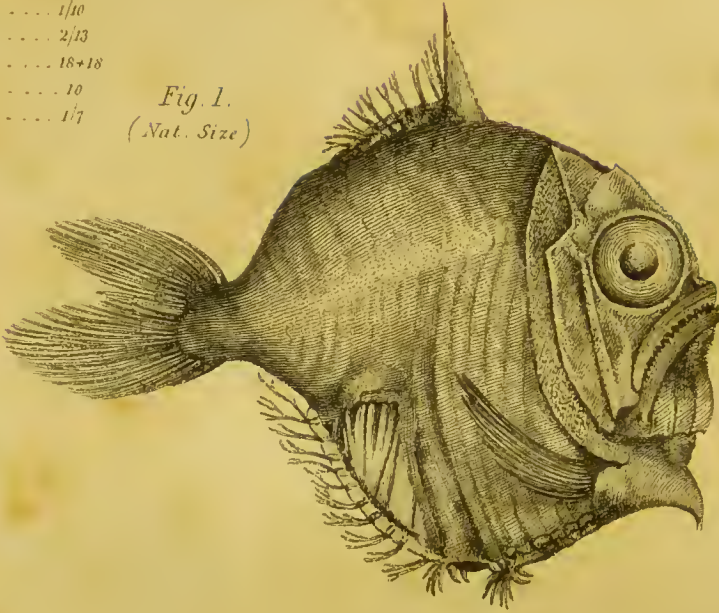


Fig. 2.
 (Nat. Size)



Fig. 3.
 (Nat. Size)



Fig. 4.



PLATE II.

Sternoptix Celebes, (one half larger than nature.)

Fig. 1.

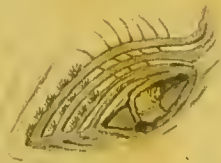


Fig. 2.



Lateral View

Fig. 3.



View of the Connexion's Inferiorly & Superiorly

of the Left Branchial Arches & Palatine Teeth
(the Branchiae being removed.)



*J. F. Macfarlane Esq. Super
from the Author*

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HISTORY
OF THE
STERNOPTIXINÆ,
A FAMILY OF THE OSSEOUS FISHES,
AND
THEIR ANATOMICAL PECULIARITIES,
WITH A DESCRIPTION OF THE
STERNOPTIX CELEBES,
A SPECIES NOT HITHERTO NOTICED.
By P. D. HANDYSIDE, M. D., F. R. S. E.,
LECTURER ON ANATOMY AND PHYSIOLOGY.
ILLUSTRATED BY TWO ENGRAVINGS.

From the Edinburgh New Philosophical Journal for October 1839.

Sect. I. *Historical Remarks.*

Professor Hermann of Strasburg, about the year 1774 applied the name of *Sternoptix* (from the apparently plicated arrangements of the external covering in the sternal region) to a very rare osseous fish from around the West India islands, small in size, truncate in front, narrow and tapering behind, high-backed, very compressed, and presenting a triangular distinctly pellucid compartment of the caudal region just behind the anus.* From the last-mentioned character, as well as to distinguish it from another genus, from the Azores, since described by M. Olfers, under the name of *Sternoptix Olfersii*,†

* See Der Naturforscher, Halle, Fasc. xvi. pl. 8. tom. i. figs 1, 2, copied by Walbaum of Lubeck in his edition of Artèdi's Ichthyologia (entitled Artedius renovatus) tom. iii. pl. 1. fig. 2., and by Cuvier in his Règne Animal, edit. 1829, pl. xiii. fig. 1., and by Shaw in his Zoology, vol. iv. p. 112.

† See Cuvier's Règne Animal, pl. xiii. fig. 2.

in which that character is wanting, the former is known to naturalists as the *Sternoptix diaphana*. Owing to the great rarity of this fish, it being hitherto known to no author excepting through the means of the very incorrect representation of it afforded by Hermann, and the specimen which that naturalist has left in the museum at Strasburg, no opportunity has yet offered for rectifying the mistakes into which Hermann fell, who described this fish as devoid of gill-membrane and of a lateral line, and who placed it among the *Apodes* of Linnæus, thus concluding it to be destitute of ventral fins. Linnæus,* indeed, at the conclusion of the description of his 1st class of fishes,—the *pisces apodes*—has, like Hermann, given very erroneously the characters of the *Sternoptix diaphana*, and it remained for Cuvier,† while noticing very shortly both species, to take occasion to correct some of the inaccuracies of Hermann, and from examination of the specimen which Hermann himself described, and which he saw at Strasburg, to introduce it at the end of the *Salmonidæ*, the fourth family of his order *Malacopterygii abdominales*.

While the two species adverted to, offer, in respect to their general form, translucency in the caudal region, number of branchial rays, character of the teeth, &c., points of difference such as to have induced Cuvier to remark, “ces deux espèces pourront former un jour les types de deux genres,” they yet agree in the situation of the teeth, and in some striking peculiarities of general structure and form.

But the species of *Sternoptix* which I proceed to describe differs from both of the preceding in many, even *generic* characters, such as the situation, character, and number of the teeth, the number of the branchial rays, and the components of the different fins, and it differs also in respect to the locality in which it occurs; for, while the two former seem to be confined to the West India Islands, and the warmer parts of the Atlantic, the latter has been hitherto observed only in the Eastern Archipelago. I am unwilling, however, in the present imperfect state of our knowledge respecting this family

* Systema Naturæ Gmel. p. 1150.

† Règne Animal, edit. 1829, tom. ii. p. 315.

of fishes, to submit the species under consideration as a new genus, although (as we have shewn) the characters peculiar to it might justify such a course, and rather, as the species of the family of *Sternoptix* which we now know, do not exceed three, I propose to confine myself at present to attempting to supply what is manifestly a desideratum in the natural history of this tribe of fishes—a description of the anatomical peculiarities of a family of fishes, which, from its extreme rarity, has been left hitherto unnoticed, adopting in my description that subdivision of it into two genera, which Cuvier anticipated, we have seen, would eventually be found justifiable.

Selecting, then, the character of presence or absence of pellucidity in the caudal region, and making the distinction to depend on that,—a character indeed which serves accurately to distinguish the two already known genera of this family, I shall, from the existence of pellucidity in the example before us, classify it with Hermann's species, naming it simply from its locality. Thus, adopting Cuvier's classification of fishes, we find the position occupied by the *Sternoptix Celebes* in the following analysis:—

OSSEOUS FISHES.

ORDER II.—MALACOPTERYGII ABDOMINALES.

Fam. IV. (a) SALMONIDÆ.

(Fam. V.?) (b) STERNOPTIXINÆ.

Gen. I. *Sternoptix diaphana*.

Species α , *S. Hermannii*.

β , *S. Celebes*.

Gen. 2. *Sternoptix Olfersii*.

Sect. II. On the *Sternoptixinæ* Family in general.

LOCALITY. The *Sternoptix* is a small osseous fish, of a very remarkable form, and of rare occurrence, confined apparently to the East and West India islands, and the warmer parts of the Atlantic.

SIZE. When full grown, it does not exceed from two to three inches in *length*, exclusive of the tail; its *height*, exclusive of the fins, is almost equal to its length; while in *thickness* it does not exceed three-quarters of an inch, that is, about one-third of its height.*

FORM. Its *body* is high, and greatly compressed, supported laterally

* See Plate I, fig. 1.

by long ribs, and, including the head and chest, is semicircular in form in front; and, while its general form is remarkably oblique, and more or less elliptical, it is a little elongated backwards to the point where its forked tail (which is about one-fourth of its length) begins. The *back* rises into a sharp ridge, which, at its middle, supports a single fin; behind this fin there is a small gibbosity or hump (membranous in the species of *Hermann*, and *Olfers*, muscular in that from *Celebes*), in a situation corresponding to the adipose and rudimental fin of the Salmonidæ, while, in front of the dorsal fin, the carinated fore part of the back after becoming sulcated, ends in two sharp ridges, which converge towards the upper part of the head, at the interparietal bone, and thence running downwards, finally diverge towards the nares at the middle of the upper lip.* The *trunk* presents inferiorly, between the extremities of the humerals and the crests of the pelvic bones, a sharp pellucid ridge or crest, a formation which depends upon the acute junction of the extremities of the ribs. On each side of this carinated ridge there is a row of from eight to twelve small depressed surfaces, corresponding, for the most part, to the extremities of the intercostal spaces, but which, having been regarded as folds of the textures around the sternum (a bone merely assumed to exist), suggested the name of *Sternoptix*. The *anus* is mean (*i. e.* equally placed between the head and tail). The *caudal region* is slightly convex, and terminates by an acute carinate edge, running along one-third of the length of the body. The outline of the *head* is, anteriorly, remarkably obtuse, and the height of that region is double its length. The *eyes* are large, salient, and naked; they occupy the middle third of the height of the head, and advance within a line of its anterior boundary. The *mouth*, which is directed upwards suddenly, descends very obliquely, so as to appear abrupt when viewed in front, and is therefore singularly capacious in the vertical direction; and the maxillary bones (the upper of which slides over the lower) form the superficial boundary of this opening. The *tongue* is small and rudimental. *Maxillary teeth* exist in the *Sternoptix*: these are very numerous and minute. They differ, however, in the several species, both in their form and arrangement, appearing either *en velours* (as in the *S. Hermanni*) or *en crochets* (as in the *S. Olfersii* and *S. Celebes*).

The BRANCHIOSTEGOUS MEMBRANE is patent, though posteriorly its margin is retracted under the opercula, and in each of the semicircular interspaces of the branchial rays it exhibits a longitudinal depression or shallow sinus.

The BRANCHIAL RAYS are from five to nine in number, very slender, naked at the extremity, and they curve downwards, backwards, and inwards.

OPERCULES. The operculum is subarcuated, soft, fine, and elastic, and terminates inferiorly in a right angle, the anterior margin of which is parallel to the last branchial ray, and partly covers it. The two branchial

apertures extend obliquely downwards underneath the lower jaw and branchiostegous membrane, nearly as far as the mesian line, where the narrow isthmus formed by the junction of the lingual bones to the symphysis of the humerals separates the two branchial openings from below. The *pre-opercule* has its shaft flattened, its border finely denticulated, and its angle armed with a strong spine projecting downwards and forwards. The *sub-opercule* is in form an incurvated cone, having its rounded base below, its concave thick margin in front, its outer surface scabrous, and studded with polygonal cells, its convex posterior border much attenuated, while superiorly it is acumined.

SPINES. [2 Pre-opercular, 2 humeral, 2 ventral, and 1 dorsal.] Besides the spine of the *pre-opercule* already described, there is behind the trochlea of the humerus a small thick *spine* curving downwards and forwards, and overlapping the ulna and radius; and below the symphysis and isthmus of the ossa humeri, which are remarkably elongated at an acute angle, there exists a sharp *spine*, which terminates each bone, and projects downwards at a point midway between the centre of the mouth and the ventral fins. A fourth strong *spine* curves downwards and forwards from the extremity of the pelvic bones on each side, and immediately in front of the ventral fin; and, lastly, in front of the first dorsal ray there rises up obliquely backwards from the first interspinal bone an extremely strong, scaly, or membranous moveable *spine*, thick and grooved behind, but finely denticulated on its anterior margin.

FINS. The *dorsal fin* is short, and has from eight to ten soft rays, bifid at their extremities. The *pectoral fins* are small, and multi-radiated. They present respectively the same number of rays as the dorsal, the superior ray being double the length of the inferior, and the intermediate rays vary in length proportionally. The *ventral fins* possess each, besides the spine, from five to seven very slender rays. They are placed about the middle of the trunk, opposite to the dorsal fin, and immediately in front of the anus. The *anal fin* is shallow, with distant rays, and is nearly longitudinal (*i. e.* extends a considerable way from the vent towards the tail). It consists of thirteen distinct soft rays, each bifurcated at its extremity. The *caudal fin* is forked, and has from thirty-six to forty rays.

SURFACE. The surface of the body of the *Sternoptix* is naked (or devoid of scales). It is covered with a dark coloured translucent mucus or epithelion.

COLOUR. The colour is variegated and very brilliant when the fish is first caught. The entire surface of its body has a tin or dim silvery lustre. The back is of a dark olive-green colour: the spines are translucent, and partake of the amber tint of the iris; and the fins and tail are intermediate between an amber and a mottled vandyke-brown hue.

LATERAL LINE. The lateral line is smooth, solitary, superior, straight, and descending.

Sect. III. *The Sternoptix Celebes.*

The *peculiarities* of this fish, serving to distinguish it from the *S. Hermannii*, the other species of the same genus, I shall next enumerate.

LOCALITY. The *Sternoptix Celebes* was caught by my friend Mr Thomas Kincaid, surgeon R. N. in September 1836, in the Straits of Macassar, 1° S. lat. and 119° E. long., and within thirty miles of the Celebes coast, during calm and clear weather. It was first observed swimming on the surface of the water, apparently disabled from a deep cut it had received upon the back. It is uncertain whether it frequents shoal or deep water, but some fish resembling it were observed swimming about the roots of trees which had been washed from the coast by the rains, and which trees the fish seemed to have accompanied from the coral reefs near the shore.

SIZE. The *length* of the specimen which I possess,* which appears to have reached full maturity, is, exclusive of the tail, two inches and a quarter, its *height* is two inches, its greatest *thickness* scarcely half an inch.

FORM OF CHEST. On each side of the carinate and pellucid lower border of the chest, is a series of small foveæ or dimples, eight in number.† There is no sternum or osseous basis supporting these pits, but simply minute fibro-cartilaginous expansions which project from the extremities of the ribs, and unite with each other at the mesial line. Accordingly, the interspaces between these being muscular, there may hence ensue, during the relaxed state of that texture, the regular depressed appearance referred to.

THE CAUDAL REGION, which runs one-half of the length of the body, is convex and carinate below, and the posterior and lower triangular portion of this cavity is, from the vertebral spines downwards, resolved into a pellucid membrane.‡ This membrane, which consists of two layers of tegumentary texture, is sustained in a tense and vibratory condition *anteriorly* by four slender bony processes, which arise from the posterior margin of the anal interspinal bone (a bone which forms truly the posterior boundary of the abdomen), and after traversing the space between the laminae of the pellucid membrane in which they radiate, in a direction obliquely downwards and backwards, serve finally to sustain the anterior rays of the anal fin. *Posteriorly*, this membrane is stretched upon the five last interspinal osseous spiculae, which, in their turn, support the middle rays of the anal fin.§

HEAD. The ridge of the *principal frontal* and *interparietal* bones is distinctly dentated. There are also similar dentations on the inferior margin of the *sub-orbital* bone.

* See Plate I. I am indebted for the very faithful and accurate delineations of the anatomy of the *S. Celebes* which illustrate this paper, to my estimable friend and late pupil, Mr Willington, surgeon at Saltisford, Warwick.

† Ibid.

‡ See Plates I. and II. figs. 1.

§ Plate II. fig 1.

The MOUTH is set with maxillary and palatine teeth. The *maxillary teeth* are very numerous and minute, and they are arranged *en crochets*, three rows in each jaw.* Each tooth presents the form of two incurvated cones applied base to base, their coneavities being directed towards the interior of the mouth.† The *palatine teeth* are much larger, and the existence of them appears to be distinctive of this species. They are five in number on each side of the mesian plane, and being arranged *en cardes*, they, on the approximation of the jaws, close after a dove-tailed manner.‡

The BRANCHIAL ARCHES§ are four in number, on the posterior half of the first three of which are placed several slender and eurved dental appendages, resembling the teeth of a garden rake. On the first or most anterior arch we count seven, on the next five, on the third three of these dental appendages. The superior half of each of these appendages is split down, or appears bristly along its distal half, and likewise at its extremity. Moreover, on the anterior half of these three arches are placed several tufts of short straight teeth, arranged *en brosses*. On the first arch are five, on the next four, and on the third three of these dental tufts. Superiorly, the *first and second pairs of arches*, after ascending in a curve, are attached by means of ligaments, situated beneath the cranium, to the sphenoid bone. The *third and fourth pairs* are attached to the upper borders of the œsophagus. Inferiorly, these arches are seen to join those of the opposite side, immediately below and in front of the large oval aperture of the œsophagus.¶ Here they are retained in contact, partly by means of a strong fibro-cellular membrane or ligament of a triangular form,|| partly by the usual intermediate chain of three minute bones continued backwards from the lingual bone.

The BRANCHIAL RAYS are five in number, naked, attenuated, and eurved.**

The DORSAL RAYS amount to (one moveable spine and) ten soft rays, each bifureated at its extremity, the terminating points fimbriated.

The ANAL FIN in the Sternoptix Celebes is furnished with soft rays, thirteen in number, connected to each other by a transverse band near the root, and bifid at their extremities, between the most anterior ray of which fin, and the posterior margin of the verge of the anus, there exists in this species (as a termination to the anal interspinal bone) a strong *anal spine*, bifid at its extremity, and eurved forwards in a direction parallel to the ventral spine.†† The large anal interspinal bone, joined to a great inferior spinous process, and extending down behind the anus, forms in this, as in a great number of other fishes, truly the posterior boundary of the abdomen.‡‡

* Plate I. fig. 3, and II. fig. 1.

† Plate I. fig. 4.

‡ Plate I. fig. 2, and II. fig. 3.

§ Plates I. fig. 2; II. figs. 2 and 3.

¶ Plate II. fig. 3.

|| Ibid.

** Plates I. and II. fig. 1.

†† Plates I. and II. fig. 1.

‡‡ Ibid.

The CAUDAL FIN is attached, as in the salmonidæ, to a very fleshy root, being moved by very powerful muscles. It is forked, and consists of thirty-six flattened, articulated, firm, and highly elastic rays. These are separated by a deep cleft into two conical fasciculi, the lower one being deeper, stronger, and more elongated, while each is inserted into the free border of one of the two segments of the semilunar shaped terminal caudal vertebra.* The seven highest rays of the root of the tail arise together from the integuments over the three or four last superior spinous processes, while the four lowest rays proceed from a line near the apices of the two last inferior spinous processes.†

The PECTORAL FINS in this species are each furnished with ten soft rays.

The VENTRAL FINS present each seven soft rays.

* Plate II, fig. 1.

† Ibid.

